

DERWENT-ACC-NO: 2003-429984

DERWENT-WEEK: 200340

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TITLE: Integrated heat spreader/integrated stiffener for flip-chip pinned grid array package, is arranged to provide stiffening support to one of thin core and coreless substrate of package

INVENTOR: BANERJEE, K; FRUTSCHY, K ; SATHE, A ; XIE, H

PATENT-ASSIGNEE: BANERJEE K[BANEI] , FRUTSCHY K[FRUTI], SATHE A[SATHI], XIE H[XIEHI], INTEL CORP[ITLC]

PRIORITY-DATA: 2001US-0964494 (September 28, 2001)

PATENT-FAMILY:

| PUB-NO | PAGES | PUB-DATE | MAIN-IPC |
|-------------------|--------------|----------------|----------|
| WO 2003030256 A2 | | April 10, 2003 | E |
| 000 | H01L 023/367 | | |
| US 20030062618 A1 | | April 3, 2003 | N/A |
| 015 | H01L 023/12 | | |

DESIGNATED-STATES: AE AG AL AM AT AU AZ BA BB BG BR BY BZ
CA CH CN CO CR CU CZ
DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP
KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
RO RU SD SE SG SI
SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW AT BE BG CH
CY CZ DE DK EA EE
ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE
SK SL SZ TR TZ UG
ZM ZW

APPLICATION-DATA:

| PUB-NO | APPL-DESCRIPTOR | APPL-NO |
|-----------|-----------------|---------|
| APPL-DATE | | |

WO2003030256A2 N/A
2002WO-US25308 August 8, 2002
US20030062618A1 N/A
2001US-0964494 September 28, 2001

INT-CL (IPC): H01L023/10, H01L023/12 , H01L023/34 ,
H01L023/367 ,
H01L023/48 , H01L023/498 , H01L023/52 , H01L029/40

ABSTRACTED-PUB-NO: US20030062618A

BASIC-ABSTRACT:

NOVELTY - An integrated heat spreader/integrated stiffener (IHS/IS) (620) is arranged to provide stiffening support to one of thin core (512') and coreless substrate (110') of a ceramic, flex, and an integrated circuit-printed circuit board (IC-PCB) package such as pinned grid array and ball grid array packages.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) carrier package; and
- (2) packaged integrated circuit.

USE - For providing stiffening support to ball grid array, flip-chip pinned grid array (FC-PGA) semiconductor packages.

ADVANTAGE - Enables increasing structural rigidity of a package and hence enables to withstand post-assembly mechanical loads such as socketing, shock loading, handling without deflection, deformation and damage. Reduces packaging parameters e.g. inductance, resistance owing to thinner size and reduced interconnection lengths. Enables aiding in control of static discharge and in heat dissipation.

DESCRIPTION OF DRAWING(S) - The figure shows a magnified partial

cross-sectional view of FC-PGA system with thin core
substrate and integrated
heat spreader with integrated stiffener arrangement.

coreless substrate 110'

flip- chip 120

pins 130

thin core 152'

die side laminate layer 514'

pin side laminated layer 516'

substrate lands 519'

IHS/IS 620

CHOSEN-DRAWING: Dwg.6/18

TITLE-TERMS: INTEGRATE HEAT SPREAD INTEGRATE STIFFEN FLIP
CHIP PIN GRID ARRAY

PACKAGE ARRANGE STIFFEN SUPPORT ONE THIN CORE
CORE SUBSTRATE
PACKAGE

DERWENT-CLASS: U11

EPI-CODES: U11-D01A3; U11-D01A5; U11-D02B1; U11-E01C;
U11-E02A3;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N2003-343405

DERWENT-ACC-NO: 1999-632766

DERWENT-WEEK: 199954

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TITLE: Stiffener structure for heat sink
attachment in
electronic semiconductor package

INVENTOR: MERTOL, A

PATENT-ASSIGNEE: LSI LOGIC CORP[LSILN]

PRIORITY-DATA: 1997US-0845696 (April 25, 1997)

PATENT-FAMILY:

| PUB-NO | PAGES | PUB-DATE | MAIN-IPC |
|--------------|-------------|------------------|----------|
| US 5977622 A | | November 2, 1999 | N/A |
| 016 | H01L 023/22 | | |

APPLICATION-DATA:

| PUB-NO | APPL-DESCRIPTOR | APPL-NO |
|----------------|-----------------|---------|
| US 5977622A | N/A | |
| 1997US-0845696 | April 25, 1997 | |

INT-CL (IPC): H01L023/22

ABSTRACTED-PUB-NO: US 5977622A

BASIC-ABSTRACT:

NOVELTY - A die is attached to substrate (2) having traces.
A stiffener (11)
functioning as dam ring to enclose encapsulant (6)
comprising of slots (12) to
receive the hooks of clips (10) is attached to the
substrate. The clips enable
heat sinks (8) to be firmly attached to the stiffener.

USE - For heat sink attachment in electronic semiconductor
packages.

ADVANTAGE - The heat sink is secured in place by the provision of hinged clips.
As the stiffener functions as a dam ring during encapsulation, additional dam ring need not be used.

DESCRIPTION OF DRAWING(S) - The figure shows side view of a stiffener attached to a cavity down semiconductor device package.

Substrate 2

Encapsulant 6

Sinks 8

Clips 10

Stiffener 11

Slots 12

CHOSEN-DRAWING: Dwg.12/14

TITLE-TERMS: STIFFEN STRUCTURE HEAT SINK ATTACH ELECTRONIC
SEMICONDUCTOR
PACKAGE

DERWENT-CLASS: U11

EPI-CODES: U11-D02B2;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1999-467121

| L Number | Hits | Search Text | DB | Time stamp |
|----------|--------|---|---|---------------------|
| 1 | 424724 | (heat with (sink top cover spreader radiate spreader metal lid slug)) | USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB | 2004/03/19 01:26 |
| 2 | 4433 | ((stiffener stiffenned stiffening) and ((heat with (sink top cover spreader radiate spreader metal lid slug))) | USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB | 2004/03/19 01:28 |
| 3 | 2003 | (substrate carrier board) and ((stiffener stiffenned stiffening) and ((heat with (sink top cover spreader radiate spreader metal lid slug))) | USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB | 2004/03/19 01:33 |
| 4 | 1559 | (extension extended extending extension extend extending extended) and ((substrate carrier board) and ((stiffener stiffenned stiffening) and ((heat with (sink top cover spreader radiate spreader metal lid slug)))) | USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB | 2004/03/19 02:20 |
| 5 | 444 | ((substrate carrier board) and ((stiffener stiffenned stiffening) and ((heat with (sink top cover spreader radiate spreader metal lid slug)))) not ((extension extended extending extension extend extending extended) and ((substrate carrier board) and ((stiffener stiffenned stiffening) and ((heat with (sink top cover spreader radiate spreader metal lid slug)))))) | USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB | 2004/03/19 02:20 |